UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/092,988	03/08/2002	Yong Che	220306US0	8535

22850 7590 04/07/2004

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
YUAN, DAH WEI D	

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 04/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/092,988	CHE, YONG	
	Examiner	Art Unit	
	Dah-Wei D. Yuan	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 February 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-4 and 11-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-4 and 11-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *06102002*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

SECONDARY POWER SOURCE HAVING A LITHIUM TITANATE

Examiner: Yuan S.N. 10/092,988 Art Unit: 1745 March 29, 2004

Detailed Action

1. The Applicant's amendment filed on February 23, 2004 was received. The title of the invention was changed. Claims 1,5-10 were cancelled. Claims 2-4 were amended. Claims 19-22 were added.

2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action issued on October 28, 2004.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 4,17,18 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The recitation "the proportion of vapor grown carbon fibers is from 80 to 50 mass%" in claim 4 is not supported in the instant disclosure. In contrast, the specification only teaches the addition of 10 mass% of vapor grown carbon fibers in the negative electrode of the battery. See Examples 1,6,8.

Claim Rejections - 35 USC § 102

5. The claim rejections under 35 U.S.C. 102(b) as anticipated by Amatucci on claims 1-3,5-7,11-13 are withdrawn, because the independent claim 1 has been cancelled.

Claim Rejections - 35 USC § 103

6. The claim rejections under 35 U.S.C. 103(a) as unpatentable over Amatucci and Tsushima et al. on claims 8-10,14-16 are withdrawn, because claim 2 has been amended. The claim rejections under 35 U.S.C. 103(a) as unpatentable over Amatucci on claims 4,17,18 are withdrawn, because claim 4 has been amended.

7. Claims 2,3,11-13,19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amatucci (US 6,517,972) in view of Nishimura et al. (US 6,103,373).

With respect to claim 2,13, Amatucci teaches a rechargeable hybrid battery/supercapacitor electrical storage system comprising a positive electrode, a negative electrode and an electrolyte. The positive electrode further comprises activated carbon whereas the negative electrode comprises $Li_4Ti_5O_{12}$, which is capable of doping and undoping lithium ions. The electrolyte is selected from the group comprising $LiPF_6$, $LiClO_4$ and $LiBF_4$. See Abstract, Column 3, Lines 61 to Column 4, Line 42; Examples 3 and 4.

However, Amatucci does not teach the addition of vapor grown carbon fibers in said negative electrode. Nishimura et al. teach the use of vapor grown fibers as a filler material in electrodes of electric double-layer capacitors and secondary batteries, especially those based on

lithium or lead. The vapor grown carbon fibers is found to improve electrical conductivity frictional characteristics, thermal conductivity and mechanical strength of the matrix material. See Abstract, Column 1, Lines 13-17. Therefore, it would have been obvious to one of ordinary skill in the art to add vapor grown carbon fibers to the negative electrode active material of Amatucci, because Nishimura et al. teach the use of vapor grown carbon fiber as a filler to improve the electrochemical and mechanical properties of the resulting rechargeable electrical storage system.

With respect to claims 3,11,12,19, Amatucci and Nishimura et al. do not specifically disclose the lattice spacing of the vapor grown carbon fibers, the relative electric capacity of the negative electrode and positive electrode, and the specific surface area of the negative electrode. However, it is the position of the examiner that such properties are inherent, given that both Amatucci, Nishimura and the present application utilize the same electrode active materials for the rechargeable electrical storage system. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference.* In re Robertson, 49 USPQ2d 1949 (1999).

With respect to claim 20, Amatucci teaches the electrolyte comprising propylene carbonate (PC). See Example 1.

With respect to claim 21, Amatucci teaches the electrolyte comprising $LiPF_6$. See Example 4.

With respect to claim 22, Amatucci teaches the separator is made of polyolefin and other polymeric microporous materials. See Column 8, Lines 32-35.

8. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amatucci (US 6,517,972) and Nishimura et al. (US 6,103,373) as applied to claims 2,3,11-13,19-22 above, and further in view of Tsushima et al. (JP 2000-228222).

Amatucci and Nishimura et al. discloses a rechargeable electrical storage system as described above in Paragraph 7. However, they do not disclose the organic electrolyte containing quaternary onium salt in addition to the lithium salt. Tsushima et al. teach a secondary power source comprising activated carbon as the positive electrode active material. A mixture of lithium salt of 0.5-2.5 mols/L and quaternary onium salt of 0.5-2.0 mols/L is used as the electrolyte. The molar ratio of the quaternary onium ions to the lithium ions in the electrolyte is from 0.25 to 4. The quaternary onium salt contains at least one quaternary onium ion selected from the group consisting of $(C_2H_5)_4P^+$, $(C_2H_5)_4N^+$ and $(C_2H_5)_3(CH_3)N^+$ and at least one counter anion selected from the group comprising PF_6^-, BF_4^- and ClO_4^-. Tsushima et al. further disclose the use of quaternary onium salt in the electrolyte can improve charge/discharge property of the energy storage device. See Paragraphs 8,9,13,14; Abstract. Therefore, it would have been obvious to one of ordinary skill in the art to use an organic electrolyte containing a quaternary onium salt and lithium salt in the electrical storage system of Amatucci and Nishimura, because Tsushima et al. teach the use of the electrolyte mixture to improve the electrochemical performance of the resulting energy source.

Response to Arguments

9. Applicant's arguments filed on February 23, 2004 have been fully considered but they are not persuasive.

Applicant's principle arguments are

(a) The battery having vapor grown fiber (Example 1) is able to provide a substantially greater initial capacity in comparison to the one having activated carbon (Example 5);

(b) electrolyte containing both a lithium salt and an onium salt can provide improved performance in comparison to the electrolyte containing either only a lithium or only an onion salt.

In response to Applicant's arguments, please consider the following comments.

(a) the batteries containing vapor grown fibers as the filler do not universally show improvement in the initial capacity. As shown in Example 3 and 4, the initial capacities of the batteries containing vapor grown fibers are inferior to those containing activated carbon or hard carbon. Moreover, the decrease in battery capacity is comparable or higher in batteries containing vapor grown fibers in comparison to those containing activated carbon or hard carbon. The Applicant has yet to demonstrated any significant and convincing results due to the addition of vapor grown carbon fibers in the negative electrode;

(b) as shown in Table B in Applicant's response, the one with the smallest rate of decrease in capacity is the battery containing onium salt and activated carbon; the one with the highest discharge at 10 mA is the battery containing $LiBF_4$ and dopable carbon; the one with the

highest discharge at 200 mA is the battery containing vapor grown carbon, onium salt and $LiBF_4$. It is difficult to generalize the effect of vapor grown carbon and onium salt on the performance of the battery due to the interaction between different variables.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dah-Wei D. Yuan whose telephone number is (571) 272-1295. The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dah-Wei D. Yuan
March 29, 2004